

# gender gaps

Where Schools  
Still Fail Our  
Children

**executive summary**

Commissioned by the

**American Association of University Women Educational Foundation**

As a follow-up to *How Schools Shortchange Girls*

Researched by the American Institutes for Research



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## **Foreword**

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The American Association of University Women Educational Foundation observed in the early 1990s that girls' needs were not adequately represented or addressed in educational reform. This glaring absence raised several questions: How were girls faring in U.S. public schools? What was girls' experience in the classroom? Was our public education system really equitable?

To answer these questions, the Foundation commissioned researchers to synthesize and analyze more than 1,000 articles and studies on girls and K-12 education. *The AAUW Report: How Schools Shortchange Girls*, first published in 1992, documented disturbing evidence that girls receive an inequitable education, both in quality and quantity, compared to that of boys.

*How Schools Shortchange Girls* catalyzed local, state, and national action to provide equitable treatment for girls in public schools. Today, few conversations about gender and education in the academic and research communities proceed without mention of the watershed report.

Six years later, research in this area has grown exponentially and occupies a central place in much of the educational reform literature. Even more important, the report prompted numerous efforts to improve educational practices for all students in public schools.

On the eve of the 21st century, what is different today for girls in America's public schools? In 1997 the AAUW Educational Foundation commissioned the American Institutes of Research (AIR) to find out. AIR revisited the themes of equity and education introduced in *How Schools Shortchange Girls*. Using recommendations and insights from the first report, *Gender Gaps: Where Schools Still Fail Our Children* assesses the progress toward equity since 1992, reconceptualizes the problem, and identifies new issues in gender equity.

Profound changes in school demographics and new challenges in American education demand

scrutiny in their impact on gender relations and equity. The report examines these conditions, including the rise in technology, a focus on educational standards and related assessments, and the creation of new academic curricula and programs, such as School-to-Work initiatives. Finally, the new report explores areas of potential equity challenges in the 21st century.

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*Gender Gaps* confirms that public schools are making progress toward equitable treatment of boys and girls, although concerns remain. Some of these concerns—such as academic tracking—are long-standing. Others—such as the impact of standards-based teaching—reflect new features of the educational landscape of the late 1990s that have an impact on gender equity.

Over the next five years the Foundation plans to tackle ambitious research questions about gender and education raised in this review. One such question concerns the differential use of classroom technology and teacher professional development. As we develop an information-based economy, more and more 21st-century jobs will require a facility with computer technology. A competitive nation cannot allow girls to write off technology as exclusively male domain. Teachers will need to be prepared to deal with this issue.

Another question concerns girls' and women's "transitions" from school to work, and from work to school. The Foundation plans a new research agenda

to examine individual, institutional, and cultural factors that influence moves between the critical spheres of education, family, and career. The preliminary discussion of School-to-Work programs in *Gender Gaps* provides one starting point for such further research.

Finally, the AAUW Educational Foundation will continue to monitor developments in K-12 public school education and educational reform.

Our goal is to ensure equal chances for all public school students to learn, excel, and achieve educationally. As *Gender Gaps* makes clear, the goal of school excellence that impels the standards movement is one and the same goal behind educational equity. The ideas are irreparably linked. Equity without excellence would be a terrible waste of talent. Excellence without equity is a contradiction in terms.

Maggie Ford  
President, AAUW Educational Foundation  
September 1998



## How Much PROGRESS HAVE WE MADE?



In 1992 the AAUW Educational Foundation published *How Schools Shortchange Girls*, a landmark report providing overwhelming evidence that girls were often ignored in the classroom and neglected in the curriculum. This report brought gender equity to the forefront of educational reform.

Six years later, on the verge of a new millennium, *Gender Gaps: Where Schools Still Fail Our Children* examines how far the nation has come toward educational equity. What is different for girls in America's schools? What gaps still need to be addressed?

Based on an analysis of approximately 1,000 research documents published between 1990 and 1998, *Gender Gaps* reveals good news and bad news. Girls have made great strides in education and probably receive a fairer education today than in 1992. While gender gaps in areas such as math and science have narrowed, other gaps—some favoring boys and some favoring girls—have persisted or emerged. For girls, an equitable education is in many respects still an elusive goal, in sight yet out of reach.

Over the last six years, there has been a profound reshaping of American education in an effort to address students' educational performance. New reforms seek to establish high standards of achievement for students and create rigorous learning environments. From charter schools and home schooling to school vouchers, alternate forms of education have made the educational landscape more complex and diverse. Changing demographics and the

introduction of computer technology into the classroom have created major new challenges for administrators and teachers. Where does gender equity fit into the new educational picture?

Some have questioned why research should focus on the educational experiences of specific groups of students, including girls, when all students in America's public schools need attention. Gender equity, they argue, distracts from challenging academic standards by catering to the particular needs of girls and hindering academic excellence. This report makes clear,

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however, that gender equity is crucial to the achievement of high standards for all students.

Equity deals with opportunity and outcomes. An equitable education is one that fosters high achievement for all students, no matter what their sex, class, race, or ethnicity. Equity is crucial to achieving high academic standards. Proponents of high academic standards for all students share with advocates of gender equity a commitment to seeing all students succeed. In 1992 educational standards were in place for one discipline: mathematics. In

1998 fourteen different sets of standards exist, including one or more for every major discipline. Equity, however, is often overlooked as an essential component of reaching high standards.

For the rhetoric of high standards to become reality, we must consider what specific groups of students need to achieve and see that they get it. We have to define who *all* students are and what they actually need. *Gender Gaps* considers the potential of standards, when paired with equity, to achieve in reality what it supports in rhetoric: academic success and opportunity for all students through public education.

When equity is the goal, all gaps in performance warrant attention, regardless of whether they disadvantage boys or girls. Rather than hold girls to boys' standards, or vice versa, schools need to give students the resources each needs to achieve a universally held high standard. In a gender-equitable and rigorous school system, gender gaps would be insignificant and all students would excel.

Attention to racial, class, and ethnic differences has further enriched equity in education since 1992. Girls are not a uniform group, nor are their needs singular. Over the past six years, research on girls has moved from an assumption of homogeneity to a focus on differences among girls. Caucasians should no more be the model against which African Americans and Hispanics are measured than boys should be the model against which girls are compared. Exploring differences not only between boys and girls, but also among girls by race, ethnicity, or class makes our understanding of equity more complex and produces a more detailed, accurate portrait of students' school identities. When we ignore the needs of historically disadvantaged groups, we underserve students we have underserved in the past. And in failing these groups, we continue to foster social injustices.

Within this complex framework of research, *Gender Gaps* assesses our progress toward equity since 1992 and raises new equity themes for the next century.



## WHAT THE RESEARCH REVEALS



### How Are Girls Doing in Math and Science?

In 1992 How Schools Shortchange Girls found that girls enrolled in fewer advanced math and science courses than boys and did not perform as well as boys on standardized tests. What's happened since then?

- ◆ A much-discussed gap between girls and boys in the actual number of mathematics and science courses taken appears to be diminishing. But gender differences remain in the kinds of courses taken, with boys often taking more advanced courses.
  - ◆ More girls enrolled in Algebra I, Algebra II, geometry, precalculus, trigonometry, and calculus in 1994 than in 1990. This is particularly noteworthy in light of research that shows taking Algebra I and geometry early in high school—generally in the ninth and tenth grades—is a major predictor of a student's continuing to college. (See Table 1.)
  - ◆ While high school girls and boys take similar numbers of science courses, boys are more likely than girls to take all three core science courses—biology, chemistry, and physics—by graduation. (See Table 2.)
  - ◆ A marked gender gap persists in physics, where girls' enrollments lag behind boys'.
  - ◆ In math and science, a larger portion of boys than girls receives top scores on the National
- Assessment of Education Progress (NAEP), a nationally representative test of specific subject knowledge given to students in the fourth, eighth, and twelfth grades. The gender gap increases with grade level. African American girls, however, match or outscore African American boys at every assessment point.
- ◆ Scores on NAEP reinforce traditional beliefs about girls' and boys' areas of relative strength: The highest scores in math, science, history, and geography are earned by boys, while girls earn the highest scores in reading and writing.
  - ◆ Scores on the Third International Mathematics and Science Study (TIMSS), an achievement test given to half a million fourth, eighth, and twelfth-grade students in 41 nations in 1995–96, also reveal a gender gap in math and science that increases with age. By twelfth grade, for example, boys significantly outscored girls. However, the gender gap in the United States was less extreme than that in other countries, perhaps because of the concerted attention to gender equity in math/science education over the last decade.
  - ◆ From 1990 to 1994, girls' enrollments in advanced placement (AP) and honors calculus and chemistry improved relative to boys' enrollment. Honors and AP courses, taught at an accelerated pace, are usually the highest-level courses high schools offer.

Generally, girls' enrollment in AP or honors courses are comparable to those of boys, except in AP physics. (See Table 3.) However, girls do not score as well as boys on the AP exams. AP courses can earn college credit for students who score a minimum of three out of five points on a voluntary exam at the end of the course. (See Table 4.)

Girls' participation is improving in some academic areas where it previously lagged, particularly in math and science. The increase in girls' enrollments is welcome news. But the number of classes taken doesn't tell the whole story. Girls are still not taking higher-level courses in science and computer science in the same numbers as boys.

### **What Is the Impact of Technology in Schools?**

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*Since 1992 school districts have invested millions in wiring schools for computer technology. In 1996, 65 percent of U.S. public schools had access to the Internet. What is the impact of this technology on gender equity and education?*

- ◆ Girls make up only a small percentage of students in computer science and computer design classes. The gender gap widens from grade eight to eleven. Girls are significantly more likely than boys to enroll in clerical and data-entry classes, the 1990s version of typing, and less likely to enroll in advanced computer science and graphics courses. (See Table 5.) And in 1996, girls comprised only 17 percent of AP test takers in computer science.
- ◆ Girls encounter fewer powerful, active female role models in computer games or software.

- ◆ School software programs often reinforce gender bias and stereotypical gender roles.
- ◆ Girls use computers less often outside of school. Boys enter the classroom with more prior experience with computers and other technology than girls.
- ◆ Girls of all ethnicities consistently rate themselves significantly lower than boys on computer ability.
- ◆ Boys exhibit higher computer self-confidence and a more positive attitude about computers than do girls.
- ◆ Teachers receive little or no training in how to use technology to create an innovative, engaging, and equitable learning environment.

A discouraging new gap is emerging, as computer science becomes the new "boys' club." The failure to include girls in advanced-level computer science courses threatens to make women bystanders in the technological 21st century. Some say computer access may one day bridge the educational gap between wealthy and poor students. But little attention has been given to how computer technology is affecting the educational gap between girls and boys. The goal should not simply be to "fix" girls to think like boys. Instead, we need to assess the role of computer technology in schools to ensure that it promotes equity and collaboration among all students.

## **What Happens in the Classroom? Teachers and Testing**

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**In 1992 How Schools Shortchange Girls documented dramatic differences in the quality and quantity of classroom attention that boys and girls receive. Are students today receiving a fairer and better education?**

- ◆ *Gender Gaps* shows that teachers receive little or no training in gender equity from schools of education. In a national survey in 1993 and 1994, the most time spent on gender equity was two hours per semester. One-third of teacher education instructors surveyed spent one hour or less on the topic.
- ◆ Girls take English courses in greater numbers than boys, except remedial English, where boys outnumber girls. (See Table 6.)
- ◆ Girls outnumber boys in crucial subjects like sociology, psychology, foreign languages, and fine arts.
- ◆ For the college-bound, gender gaps persist on high-stakes tests. On the SAT, a standardized test used in college admissions and scholarship eligibility, males of all racial and ethnic backgrounds score higher than females on the math section. On the verbal test, males still score significantly higher than females. The gender gaps are widest among high-scoring students. (See Table 7.) Only on the verbal section of the American College Testing Program (ACT), another standardized test used in college admissions, do girls outscore boys.
- ◆ Girls take more AP courses in English, biology, and foreign languages.

◆ More girls than boys take the voluntary AP tests to earn college credit. In fact, African American girls are far more likely to take AP exams than African American boys by a factor of almost two to one. Girls, however, receive fewer scores of 3 or higher, the score needed to receive college credit. This is true even in subjects like English where girls traditionally earn top grades.

◆ The introduction of a writing section to the Preliminary Scholastic Assessment Test (PSAT) in 1997 raised girls' scores and significantly narrowed the gender gap in scores favoring boys (from 4.5 to 2.7 points). The PSAT, usually taken by high school juniors nationwide, determines who will receive prestigious and lucrative scholarships.

Excellent education—education that meets high standards—requires equitable teaching. But teachers, because they receive little or no training in equity from schools of education, are unprepared. Teaching materials, such as computers and textbooks, also need attention. While textbooks have become more gender-conscious, many still place female characters in stereotypical roles that reinforce biases. Computer technology in the classroom also runs the risk of exacerbating rather than diminishing inequities.

High-stakes tests, those that determine college scholarships, admissions, and course credit, magnify gender gaps between girls and boys bound for college. For reasons that continue not to be entirely clear, girls consistently earn better grades than boys, but score lower on standardized tests.

## **Are Students at Risk?**

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*The 1992 report called attention to the "evaded curriculum," tough issues facing students such as pregnancy, violence, and harassment that are rarely discussed in school. Do girls and boys face different risks? Why do some students succeed in the face of such risks while others do not?*

- ◆ The four most serious threats to girls' health and education are depression, delinquency, substance abuse, and pregnancy.
- ◆ One in five girls says she has been sexually or physically abused (usually by family members). One in four girls shows signs of depression, and one in four does not get health care when she needs it.
- ◆ The link between substance abuse and dropping out appears stronger for boys, and the link between substance abuse and criminality appears stronger for girls.
- ◆ The teen birth rate dropped by 17 percent among African Americans between 1991 and 1996, and by more than 9 percent among non-Hispanic whites. There was no similar decline in birth rate for Hispanic teens.
- ◆ Research shows that abstinence-only programs are not especially effective in encouraging students to delay sexual intercourse. Programs advocating protection against sexually transmitted diseases have been somewhat more effective. AIDS education programs have been particularly successful.
- ◆ Four out of five eighth- through eleventh-grade students who took part in a nationwide 1993 AAUW poll said they had experienced sexual harassment, defined as "unwanted and unwelcome sexual behavior

which interferes with your life." Girls are the targets of harassment more often than boys.

- ◆ Boys repeat grades and drop out of school at a higher rate than girls. However, girls who repeat a grade are more likely to drop out than boys who are held back. Not only is being held back more harmful to girls, so is dropping out. Girls who drop out are less likely to return and complete school.
- ◆ Dropout rates are especially high among Hispanic girls. In 1995, 30 percent of Hispanic females age 16-24 had dropped out of school and not yet passed a high school equivalency test. In contrast, dropout rates for white students and black males have remained stable. Dropout rates for Hispanic males and black females have declined.
- ◆ Girls are twice as likely to be inactive as boys, and male high school graduates are more likely than females to have taken at least one year of physical education. Research links physical activity for girls to higher self-esteem, better body image, and lifelong health.
- ◆ Boys outnumber girls in team sports, while girls outnumber boys in performing arts, school government, and literary activities.
- ◆ Poverty is the largest barrier to participation in sports or extracurricular activities, which are linked to better school performance, good health, and a sense of culture and community.

Girls are more vulnerable than boys to some risks. Girls confront widespread sexual violence and harassment that interferes with their ability to learn, both within the family and within the schools. Schools limit gender equity when they fail to confront or discuss risk factors for students.

The teen pregnancy rate has declined slowly but steadily from 1991 (when 62 percent of all pregnant women were teens) to 1996 (when 55 percent were teens). The number of teen births has also dropped. However, the decline is not consistent across all racial and ethnic groups. It is unclear whether school interventions have contributed to the decline in pregnancy and birth rates. Most troubling, school sex education programs tend to place primary responsibility for teen pregnancy on girls, while boys' sexual behavior goes relatively unmodified and unchecked.

Rather than try to provide students a risk-free environment—an impossible task—youth workers today focus more on building students' coping skills so they can withstand stress and weather crises. Such a "resiliency" approach builds on the social and cultural strengths and resources of students and their communities. School programs have the potential to help students develop strengths to overcome risks and succeed.

### **Are Students Prepared for the Work Force?**

*Since 1992 some school districts have launched School-to-Work and other career preparation programs to give students a taste of "real world" careers. Have these programs encouraged girls and boys to pursue fields considered nontraditional for their sex?*

- ◆ School-to-Work programs often fail to live up to their promise of helping women and minorities enter fields that are nontraditional for their race or gender. A recent study of 14 School-to-Work sites, for example, found that more than 90 percent of the young women were clustered in five traditionally female occupations.

- ◆ A 1997 review of School-to-Work initiatives across the country similarly found that "boys tended to dominate—almost to the point of exclusion—in many industrial and engineering programs."
- ◆ With caseloads of up to 300 students, school counselors—who are best positioned to help students make informed career decisions—are often hard-pressed to carry on meaningful interaction with students.

Students still face gender barriers when they prepare to enter the work force. School-to-Work and other new career preparation programs have pledged to recruit boys and girls into nontraditional fields, but have achieved limited success. Simply offering boys and girls the same menu of career choices without actively encouraging them to consider nontraditional fields does little to change the status quo.

Ironically, some programs that make conscious efforts to interest girls and boys in nontraditional fields face resistance from students themselves who have entrenched ideas about what careers are appropriate for them. While boys tend toward careers in business, managerial, technical, and engineering careers, girls cluster in the social sciences, health services, and education. (See Table 8.)

The channeling of students into "gender-appropriate" fields reinforces gender inequities in the work force. In today's economy, women cluster in only 20 of the more than 400 job categories, and two out of three minimum-wage earners are women.

These issues are discussed in detail and the research fully annotated in the full report of *Gender Gaps*.



## CONCLUSION



Have schools made progress toward equity since 1992? In critical areas such as math and science, the answer for girls is a definitive yes, although as *Gender Gaps* makes clear, some troubling gaps remain. The field of public education is ever-changing. And so, even as we narrow historic gaps, new ones emerge; technology is the prime example.

In the 21st century, America's public schools will have to serve the needs of an increasingly diverse student body. Gender equity research and practice will have to take into account the unique needs of diverse populations of girls entering the public schools. Even as girls narrow many gaps in math and science, new disciplines—like computer science, biotechnology, and environmental science—could produce new gender gaps. For girls to achieve economic independence and participate fully in the boom industries of the 21st century, educators will need to ensure that girls are included in these fields. Similarly, as we enter a

more information-based global economy, boys will need to be encouraged to pursue and develop communication skills.

For all students to achieve in school, educators, parents, and policymakers must develop strategies to address the different learning styles of all students. We must give all public school students, both girls and boys, the chance to learn, excel, and achieve educationally.

As *Gender Gaps* makes clear, the goal of school excellence that impels the standards movement is one and the same goal behind educational equity. Gender equity and the achievement of high standards for all students are inextricably linked. Yet few standards, as written, acknowledge equity issues. And few of those states that have adopted standards containing equity language have developed implementation strategies to ensure that all students can reach the new standards.

This must change. Equity is the key to excellence in education.



# R ECOMMENDATIONS



## **Math and Science**

- ◆ Schools and school districts should concentrate on increasing the percentage of girls who take the trio of core science courses: physics, biology, and chemistry. In this trio, physics shows the most problematic gender gap.
- ◆ States should make Algebra I and geometry—the gatekeeper classes for college admissions and advanced study in math, science, engineering, and computer science—mandatory for all students.
- ◆ Teachers and counselors should encourage girls to take math and science classes at the challenging AP or honors level.

## **Technology**

- ◆ Teachers need guidance on how to use classroom technologies to advance the dual goals of excellent and equitable education.
- ◆ Educators need to develop programs at the classroom, school, district, or state level to increase girls' enrollment in computer science courses.
- ◆ Much more research is needed on gender equity and technology. Research should identify school applications of technology that are both challenging and equitable and

that encourage both girls and boys to see themselves as imaginative and collaborative “power users” of technology.

## **The Classroom**

- ◆ States that adopt standards must address equity and develop implementation strategies to ensure that all students can reach the new standards.
- ◆ Equity must be viewed as essential to teacher education and the achievement of academic excellence. Teacher education schools must integrate equity into preservice training.
- ◆ Producers and purchasers of educational materials should establish processes and criteria by which to screen curricula and instructional materials for bias in images, text, or logic.
- ◆ Colleges and universities should continue to use a broad range of material to assess students.
- ◆ The relationship between girls' and boys' test scores and grades should be further researched.
- ◆ As with the PSAT, testing organizations should consider adding a writing section to the SAT exam to more accurately reflect students' academic skills.

## Risks

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- ◆ Educators and youth advocates should develop specific programs for Hispanic girls to try to stem their high dropout rate.
- ◆ Given the demonstrated benefits of extracurricular activities to girls' academic achievement and esteem, schools need to address more aggressively the socioeconomic barriers and other factors that limit student participation. Schools should structure extracurricular activities at times when they do not interfere with employment opportunities.
- ◆ Future programs to reduce students' vulnerability to risks such as violence and teen pregnancy should focus on building students' coping skills by drawing on their cultural strengths and resources.
- ◆ All schools should develop, implement, and enforce sexual harassment policies. Harassment affects educational success by making schools unpleasant and unsafe.
- ◆ Programs to diminish teen pregnancy or school violence should adopt an approach that involves all students—boys and girls.
- ◆ Researchers should examine further the different relationship for girls and boys between grade repetition and dropping out.

## The Work Force

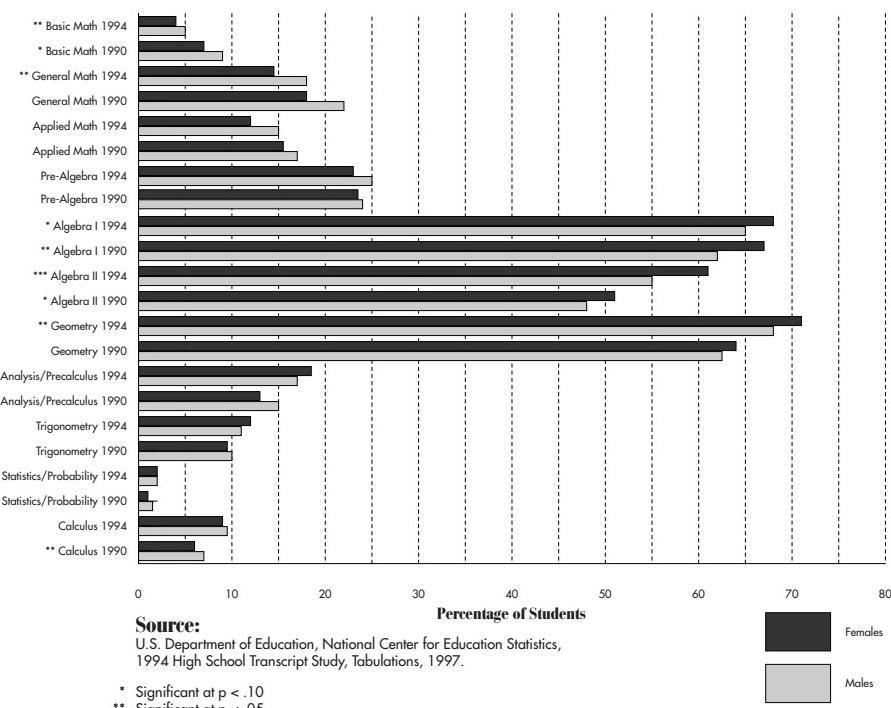
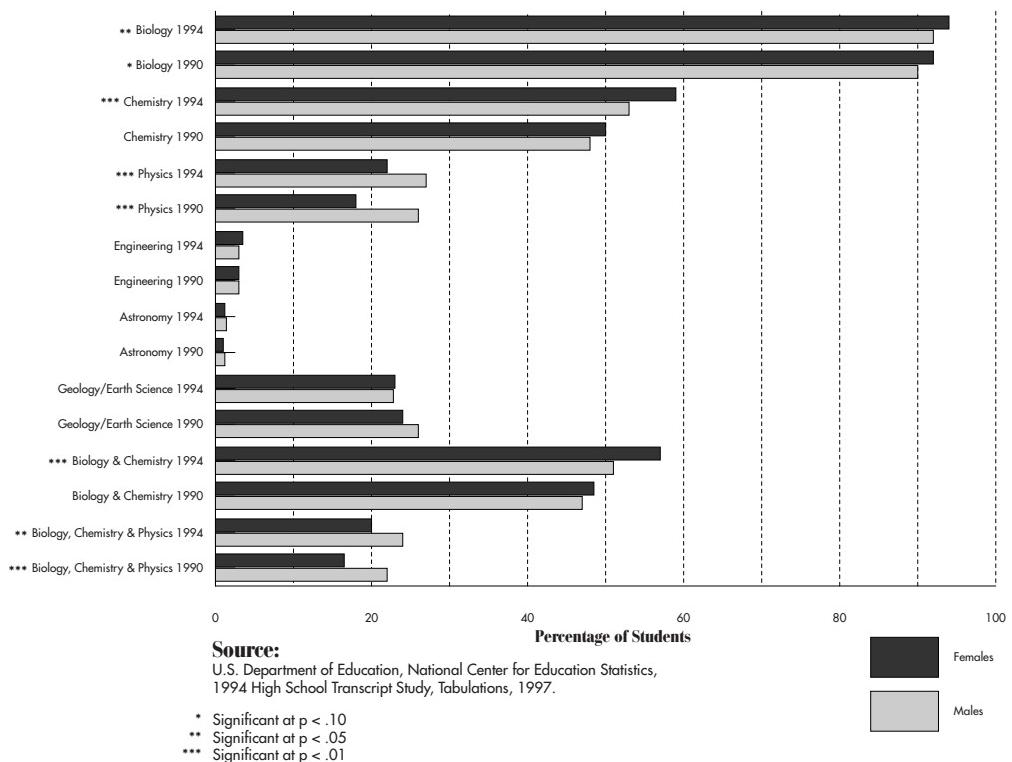
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- ◆ Teachers should seize opportunities to relate their course content to "real world" careers and to challenge students' ideas about gender-appropriate careers.
- ◆ The School-to-Work initiative at the federal level should identify and replicate model programs—including internships, externships, and apprenticeships—that encourage nontraditional career exploration for boys and girls.
- ◆ Researchers should investigate what girls, especially, know about economic trends and the relationship between curriculum, course-taking choices, and career options. Educators and counselors should devise plans to discuss these issues with students.

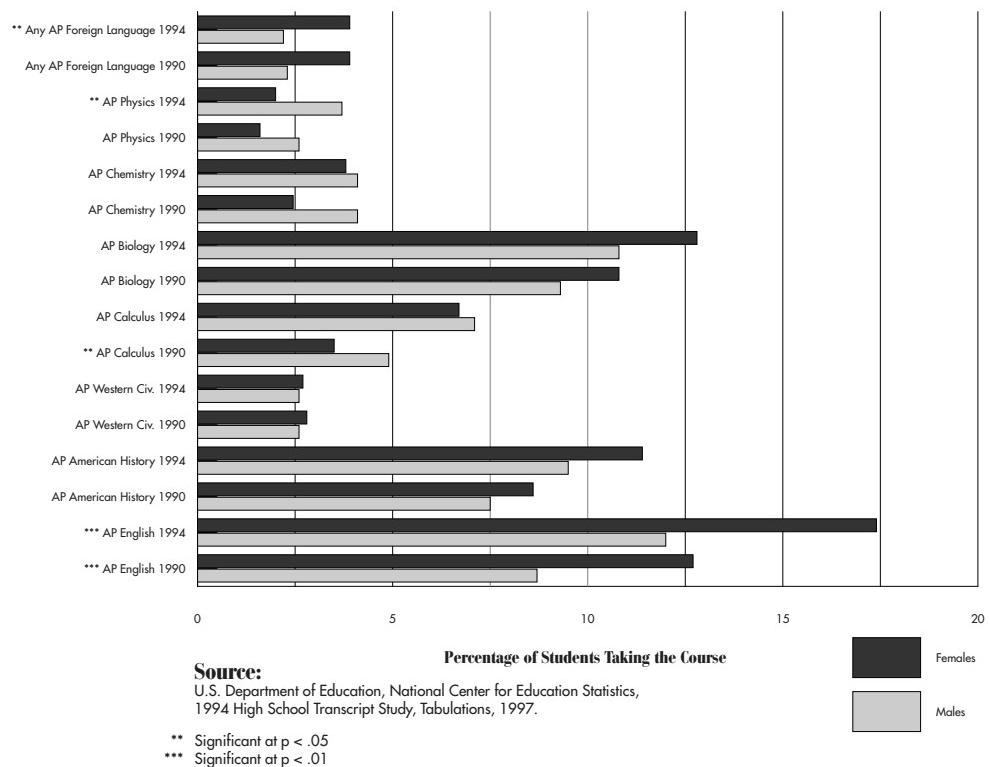
## Future Research

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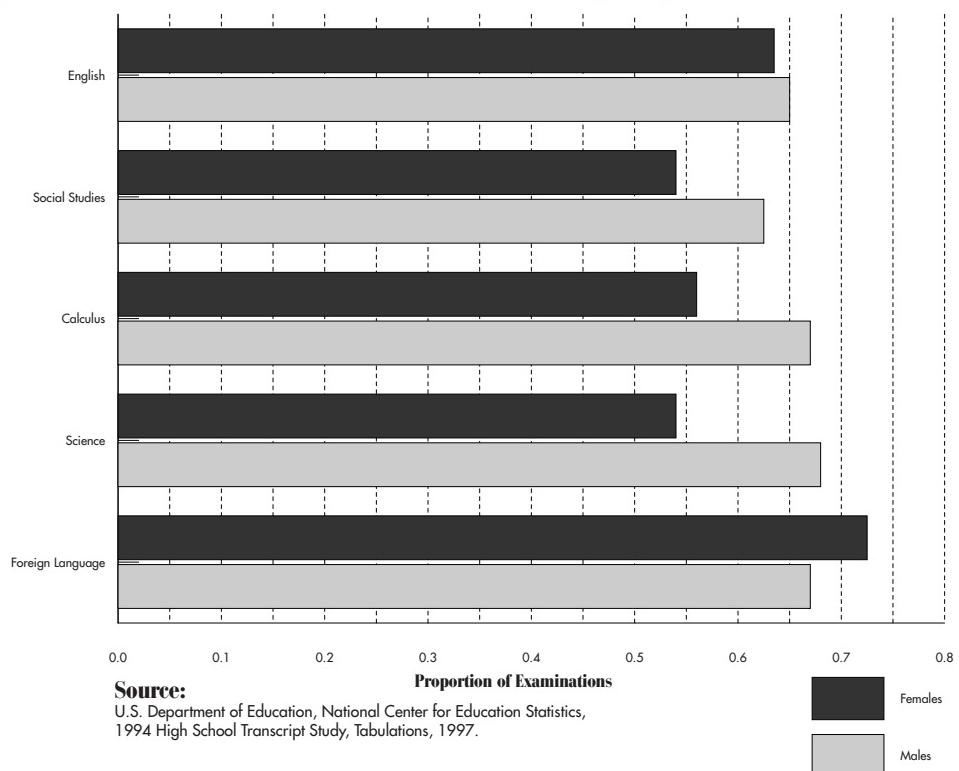
- ◆ Research should analyze educational data by sex, race, ethnicity, and social class to provide a more detailed picture of all students.

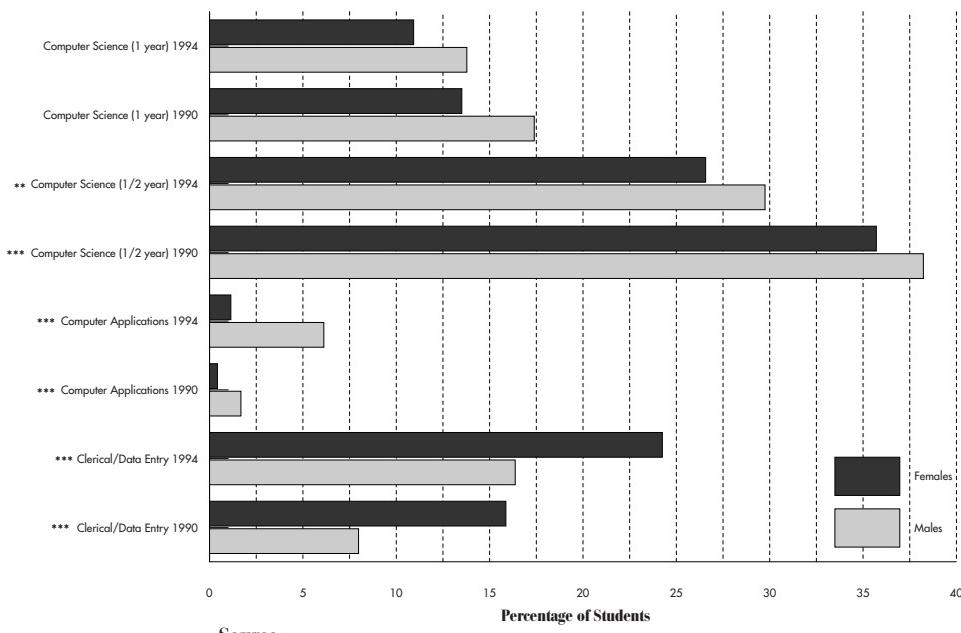
**Table 1****Percentage of 1990 and 1994 High School Graduates Taking Specific Mathematics Courses by Gender****Table 2****Percentage of 1990 and 1994 High School Graduates Taking Specific Sciences Courses by Gender**

**Table 3**  
**AP Course Taking by Gender, Subject, Year**



**Table 4**  
**Proportion of 1995 AP Examinations with Scores of 3 or Higher by Gender**

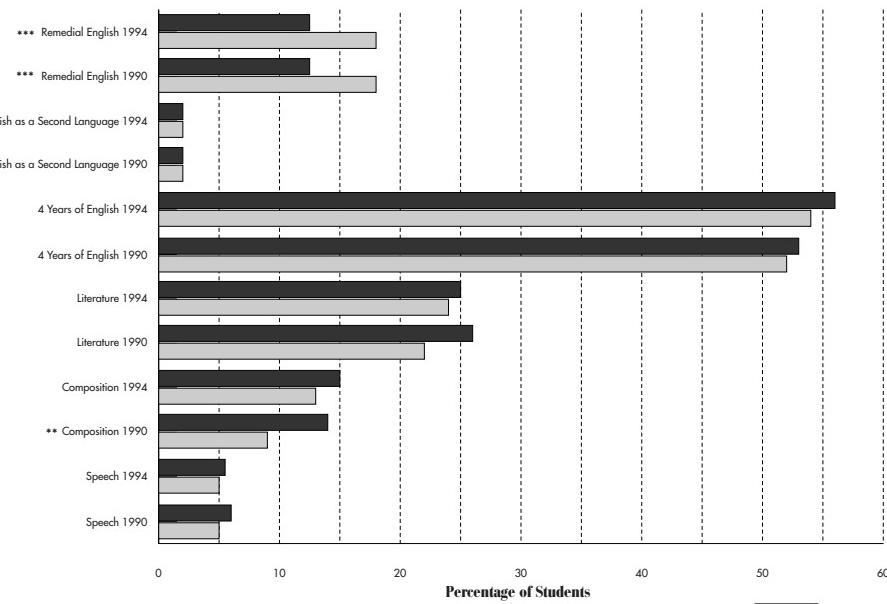


**Table 5****Percentage of 1990 and 1994 High School Graduates Taking Specific Computer Courses by Gender****Source:**

U.S. Department of Education, National Center for Education Statistics, *Vocational Course Taking and Achievement: An Analysis of High School Transcripts and 1990 NAEP Assessment Scores* (Washington, DC: 1995).

\*\* Significant at  $p < .05$

\*\*\* Significant at  $p < .01$

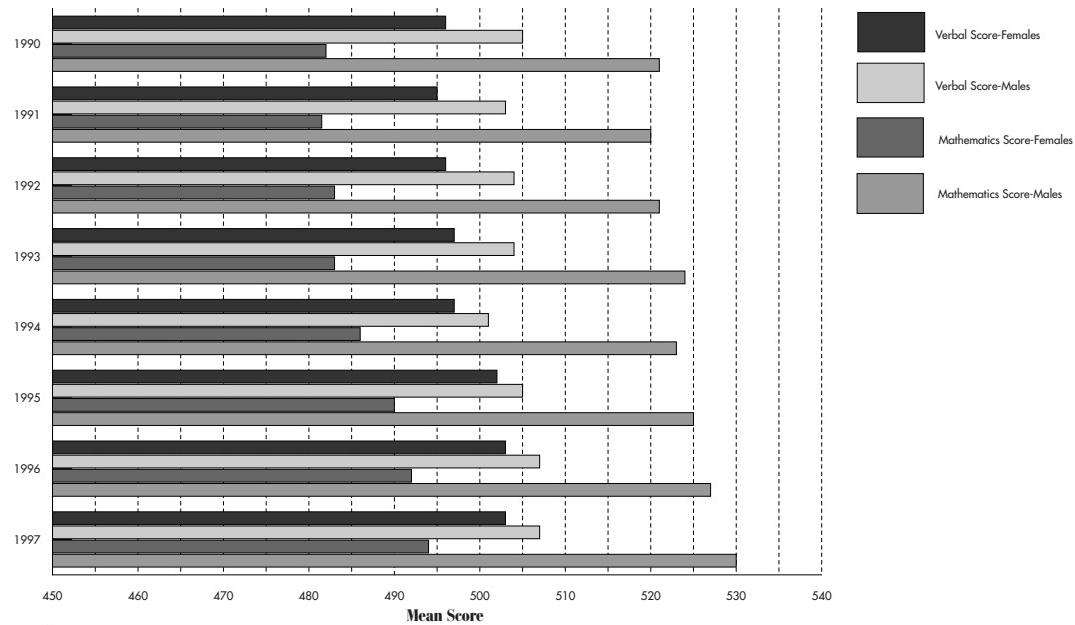
**Table 6****Percentage of 1990 and 1994 High School Graduates Taking Specific English Courses by Gender****Source:**

U.S. Department of Education, National Center for Education Statistics, *1994 High School Transcript Study, Tabulations*, 1997.

\*\* Significant at  $p < .05$

\*\*\* Significant at  $p < .01$

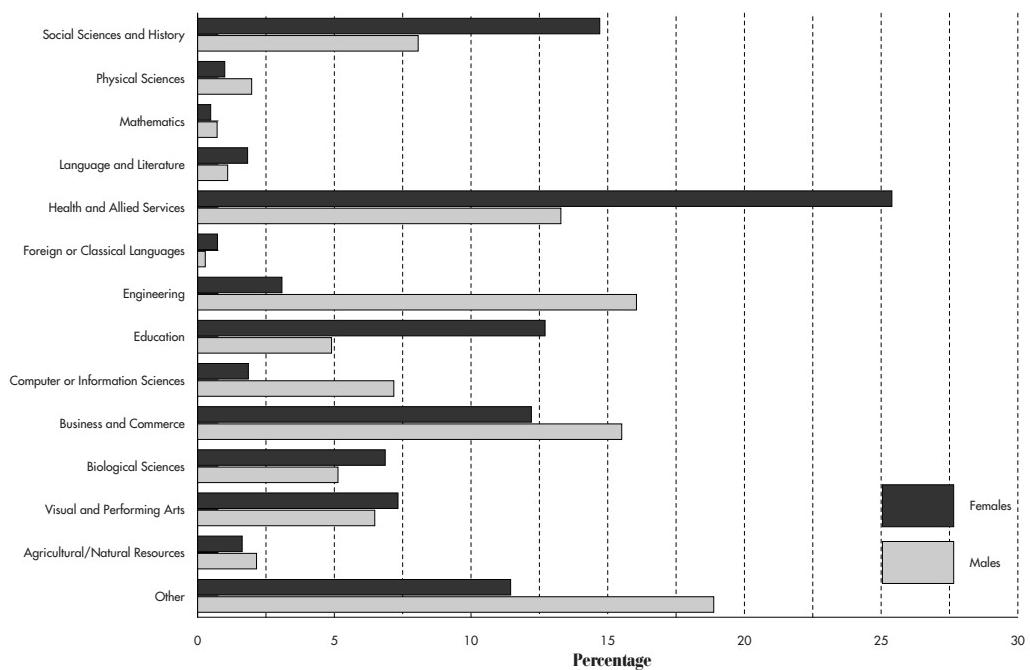
**Table 7**  
**Mean SAT Verbal and Mathematics Scores by Gender, 1990-1997**



**Source:**

College Bound Seniors: A Profile of SAT Program Test Takers (New York: College Entrance Examination Board and Educational Testing Service, 1997)

**Table 8**  
**Percentage of Intended College Majors (SAT Takers)**



**Source:**

College Bound Seniors: A Profile of SAT Program Test Takers (New York: College Entrance Examination Board and Educational Testing Service, 1997)

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